

Fieldwork

USGS Will Collaborate with Coast Salish Indigenous Peoples to Measure Water Quality in the Salish Sea (Puget Sound and Strait of Georgia)

By Eric Grossman and Helen Gibbons

In an exciting new partnership between the Coast Salish (indigenous peoples of the Salish Sea ecoregion) and the U.S. Geological Survey (USGS), members of western Washington Tribes and British Columbia First Nations will measure water quality in Puget Sound and the Strait of Georgia during their annual summer canoe voyage, the Tribal Journey (URL <http://tribaljourneys.com/>). Currently, groups paddling more than 100 canoes are planning to set out from locations throughout

Washington State and British Columbia, Canada, and travel during July 2008 along six principal paths to Cowichan, southern Vancouver Island, for the biggest potlatch of the year. The annual Tribal Journey honors the centuries-old traditions of transport and trade by peoples living around the Salish Sea ecoregion—the large inland waterway that encompasses Puget Sound in the United States and the Strait of Georgia in Canada.

Historically, Coast Salish people traveled the waters to meet and gather for festivities. Use of traditional water routes was revitalized in 1989, and the modern summer Tribal Journey is now an important event for many Tribes and First Nations. The landing of the Tribal Journey at Cowichan will also serve as the opening

ceremony for the 2008 North American Indigenous Games (URL <http://www.cowichan2008.com/>).

This summer, a scientific component will be added to the Tribal Journey's rich array of cultural activities. Four to six of the canoes (the number has yet to be

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Eric Grossman (seated) discusses logistics for data collection with (left to right) canoe skipper **Eric Day**, water quality scientists **Rachel Lovellford** and **Sarah Akin**, director of Office of Planning and Community Development **Charlie O'Hara** (all from Swinomish Indian Tribal Community), and USGS hydrologist **Paul Schuster** at a breakout session at the Third Annual Coast Salish Gathering.



▲ Installing a water-quality probe and GPS unit on a traditional canoe during a breakout session at the Third Annual Coast Salish Gathering.

► Testing the equipment.



Sound Waves

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Fieldwork, continued

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finalized) will carry water-quality probes and Global Positioning System (GPS) units on each of four to six of the principal routes to Cowichan. The probes will measure surface-water temperature, conductivity (salinity), pH, dissolved oxygen, total dissolved solids, and turbidity. Upon completion of the Tribal Journey, the data will be downloaded and used to compile a database of water-quality measurements across the Salish Sea, maps, geographic-information-system (GIS) data layers, and reports that will help Tribal, Federal, State, and local entities identify water-quality issues and ultimately manage Salish Sea resources. USGS geologist **Eric Grossman** has been invited by the Coast Salish to provide scientific advice and technical expertise in planning and conducting the study and analyzing the data.

"The annual Tribal Journey of the Coast Salish offers a unique and unprecedented opportunity to measure the pulse of the Salish Sea's environmental health," said **Grossman**, who has been studying the effects of urbanization on water quality and habitat in Puget Sound (for example, see "Deltaic Habitats in Puget Sound—Natural Versus Human-Related Change," *Sound Waves*, December 2004/January 2005, URL <http://soundwaves.usgs.gov/2005/01/fieldwork3.html>).

Grossman and Coast Salish partners are excited about the upcoming project. **Grossman** notes that at the end of this summer's Tribal Journey, the Coast Salish and the USGS "will be able to map out data captured simultaneously across a broad expanse of the Salish Sea." The data will provide a snapshot of conditions during summer 2008 that "we can compare with processes that affect water quality throughout the region—such as river discharge, tides, winds, currents, and coastal upwelling—and with future measurements along successive journeys."

The feasibility of conducting water-quality studies during a canoe voyage like the summer 2008 Tribal Journey was successfully demonstrated during a 1,200-mile long canoe trip down the Yukon River in summer 2007. The Yukon River Healing Journey—from Moosehide, Yukon Terri-

(Coast Salish continued on page 3)



George Adams, canoe skipper for the Nooksack Indian Tribe, holding a water-quality probe.



The Paddle is the symbol of the Coast Salish gathering and shares with the world that we are the people of the shores and beaches of the Salish Sea. The salmon within the logo represents the sustainable element of our cultural life ways as Coast Salish people. The salmon is our identity—it carries our spirits, brings food to our families, and keeps our bodies healthy. When the salmon becomes extinct, you will see our life ways as we know them today become extinct.

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tory, Canada, to Russian Mission, Alaska (approx 130 mi from the mouth of the Yukon as the crow flies)—was undertaken to promote environmental awareness and celebrate cultural ties, with visits to indigenous villages along the way. During the planning stages, **Jon Waterhouse**, director of the Yukon River Inter-Tribal Watershed Council (YRITWC), asked **Paul Schuster**, a USGS hydrologist who helped the council establish a regional water-quality-monitoring program (URL <http://www.yritwc.com/programs/WaterQuality.htm>), if he could suggest a way to “marry culture and science” on the Yukon River canoe journey. **Schuster** said, “Why don’t you just drop a water-quality probe off the side of the canoe?” and soon they were designing a project to make continuous water-quality measurements along more than half the length of the 2,300-mi-long Yukon River. Instrument manufacturer YSI Inc. lent a state-of-the-art water-quality probe that was towed behind the modern two-person

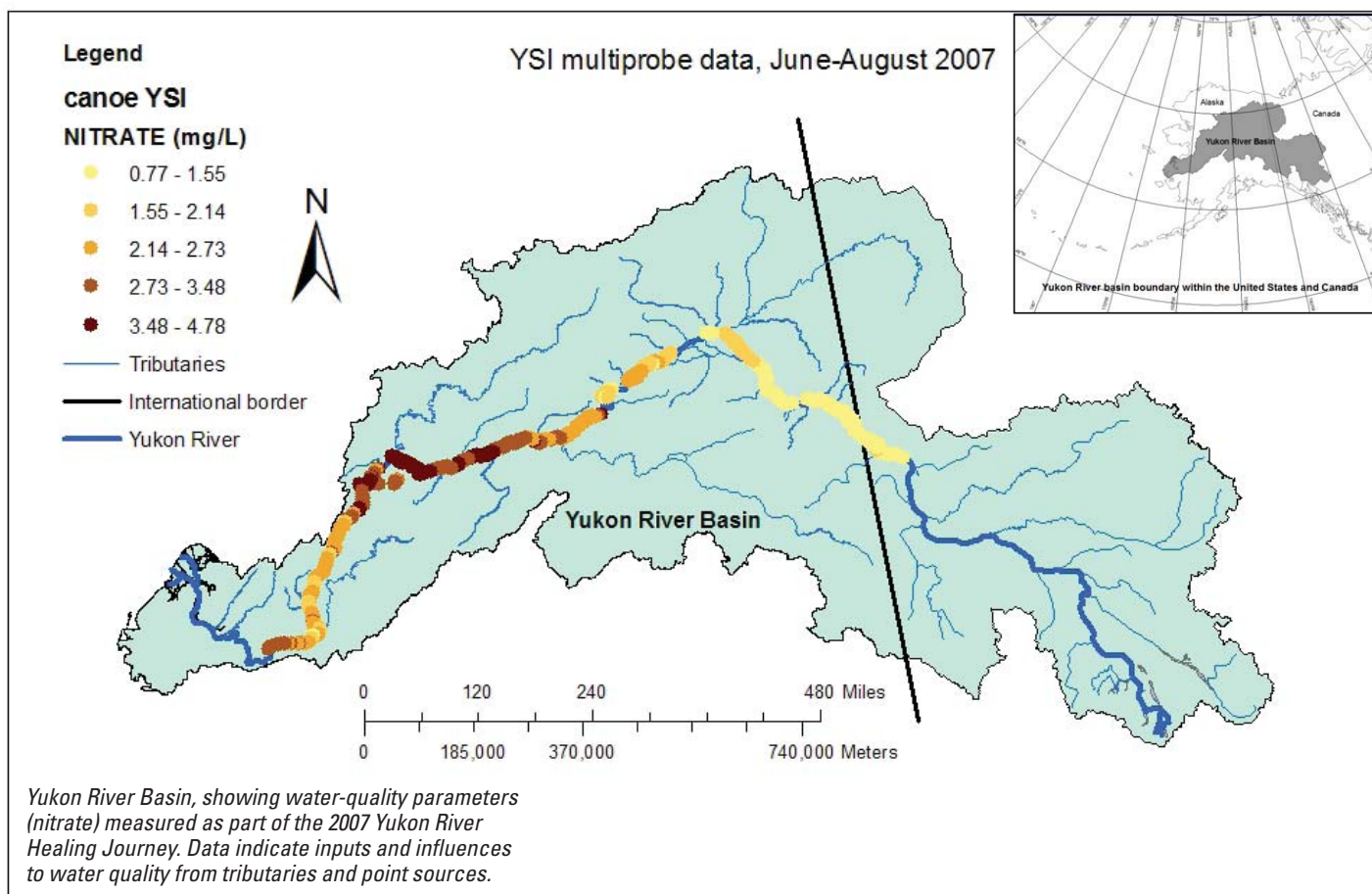
canoe captained by **Waterhouse**. The canoe was also fitted with foldout solar panels and an inverter for charging batteries to run a computer, video, and GPS unit, illustrating “how the YRITWC and indigenous people of the Yukon River watershed are blending traditional practices with modern technology to take care of the land and water” (YRITWC newsletter, *Currents*, July 2007, v. 2, no. 2 [URL <http://www.yritwc.com/newsletter/>]).

A canoe is an ideal platform for towing the water-quality probe: “If you go too fast,” said **Schuster**, “the probes don’t work.” Motorboats, even at their slowest speed, move fast enough to cause air pockets to form around the water-quality probes (a process known as cavitation), which interferes with the probes’ performance. The solution is to use new technology with old. **Waterhouse** and his paddling partners towed a 15-lb, torpedo-shaped water-quality probe off the stern of their canoe, measuring surface-water tem-

perature, conductivity (salinity), nutrients, pH, and total dissolved solids. **Schuster**, who had been part of a 5-year-long USGS study of water quality and climate change in the Yukon River basin (URL <http://ak.water.usgs.gov/yukon/index.php>) called the results “a unique and very interesting dataset,” adding, “We learned a lot about the river that we hadn’t discovered in the 5 years we’d been working there.”

The idea of integrating a water-quality study into the 2008 Salish Sea Tribal Journey was developed in late 2007 and formally adopted at the Third Annual Coast Salish Gathering, held February 27-29, 2008, in Tulalip, Washington (URL <http://www.coastsalishgathering.com/>). At the Gathering, **Brian Cladoosby**, chairman of the Swinomish Indian Tribal Community (URL <http://www.swinomish.org/>), familiarized Coast Salish elders and leaders with the study and the intention of the Coast Salish-USGS partnership to address

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(Coast Salish continued from page 3)

issues related to the recent deterioration of ancestral waterways and marine resources that for millennia have sustained the Coast Salish. Among the goals of the Coast Salish Gathering were to integrate the diverse indigenous peoples of the Salish Sea under one Coast Salish voice and to adopt an environmental science and policy agenda that will help the Coast Salish sustain their environment and marine resources, which are closely linked to their culture and identity.

During the Gathering, Coast Salish elders and leaders, and scientists from Tribes, First Nations, academia, and numerous agencies—including the U.S. Environmental Protection Agency (URL <http://www.epa.gov/>), Environment Canada (URL <http://www.ec.gc.ca/>), and Parks Canada (<http://www.pc.gc.ca/>)—highlighted critical impacts to nearshore ecosystems that mirror problems identified by the Puget Sound Nearshore Partnership (URL <http://www.pugetsoundnearshore.org/>). These impacts include historical changes in fish-, bird-, plant-, and invertebrate-community structure; increases in parasites (sea lice) and invasive species; sedimentation impacts to shellfish-harvest areas and fish migratory pathways; impacts of trawling on benthic ecosystem structure and function; and increases in pollution from both point and nonpoint sources, especially wood-pulp mills, metal refineries, and dairy farms. Improving our understanding, and ability to predict the extent, of these impacts to nearshore habitats, estuarine processes, and marine resources is the principal mission of the USGS Coastal Habitats in Puget Sound Project (URL <http://puget.usgs.gov/>), in cooperation with its many partners.

“The Coast Salish have extensive traditional ecological knowledge of their environment and patterns of change across the Salish Sea,” said **Grossman**, noting that the plan to collect water-quality data during the 2008 Tribal Journey “will provide a unique opportunity to use traditional ecological knowledge and western science to improve understanding of ongoing change to the region’s ecologic and cultural resources and the processes that affect them.”

Grossman will serve as scientific advisor to Coast Salish for the Tribal Journey, and **Sarah Akin** of the Swinomish Indian Tribal Community will serve as project coordinator. **Grossman** and **Akin** have been conducting workshops for Coast Salish participants in preparation for the Trib-

al Journey. To learn more about the Tribal Journey, visit URL <http://tribaljournies.wordpress.com/tribal-journies-of-the-nw/>. To learn more about the history, peoples, and mission of the Coast Salish, visit URL <http://www.coastsalishgathering.com/>.



Summer 2007 Tribal Journey, in which 88 Native American Tribes from Washington State and First Nations of British Columbia, Canada, paddled along several pathways to a common host destination at Lummi, Washington, over the course of 3 to 4 weeks. Red star, summer 2008 destination: Cowichan, British Columbia, Canada. (Routes in 2008 may differ from those in 2007.)

Sea-Otter Study Reveals Striking Variability in Diets and Feeding Strategies

By Tim Stephens, University of California, Santa Cruz

Ecologists have long observed that when food becomes scarce, animal populations exploit a wider range of food sources. So scientists studying southern sea otters at different sites in California's coastal waters were not surprised to find that the dietary diversity of the population is higher where food is limited. But this diversity was not reflected in the diets of individual sea otters, which instead showed dietary specialization in response to limited food.

The new findings by researchers at the University of California, Santa Cruz (UCSC) and the U.S. Geological Survey (USGS) were published in a paper in the *Proceedings of the National Academy of Sciences* for January 15, 2008 (URL <http://www.pnas.org/cgi/content/abstract/105/2/560>). The study found that all sea otters in an area with abundant food resources share the same dietary preferences. Where food is limited, however, a diverse array of feeding strategies emerges, with individual sea otters specializing on particular types of prey.

Tim Tinker, a USGS research ecologist (and research fellow at UCSC) and the first author of the paper, said that the study has both theoretical implications for the science of ecology and practical implications for wildlife management.

"The traditional way of viewing the relationships between predators and prey and how food webs are structured may be oversimplified," **Tinker** said. "When you look at the population as a whole, you may see a diversification of the diet in response to limited food resources. But when you look at individuals, you see dietary specialization."

One implication of this dietary specialization for California sea otters is that some otters may be exposed to certain food-borne pathogens much more frequently than otters with different diets. "A lot of sea otters in the central-coast population are dying from infectious



Tim Tinker observes radio-tagged sea otters off the coast of central California. **Tinker** and his team use radio telemetry to locate a study animal in a kelp bed, and then use high-powered telescopes to gather data on feeding behavior and diet. Photograph by **Ian Adams** (Corvus Consulting, British Columbia, Canada).

diseases, and this could help us to better understand that disease mortality by allowing us to pinpoint the specific vectors of disease transmission," **Tinker** said.

Tinker's coauthors are **Gena Bentall**, who worked on the study as a UCSC graduate student and is now with the Monterey Bay Aquarium's sea-otter research and conservation group; and **James Estes**, who worked on this study as a USGS wildlife ecologist (now retired) and is now professor of ecology and evolutionary biology at UCSC and interim director of the STEPS (Science, Technology, Engineering, Policy, and Society) Institute at UCSC. The study compared sea otters on the central California coast, which has the largest population of southern sea otters, with those in a much smaller population around San Nicolas Island off the southern California coast.

The San Nicolas population is the result of an effort by the U.S. Fish and Wildlife Service to reduce the vulnerability of California sea otters to oil spills by establishing a separate population from the main one on the central coast. In the late 1980s, about 140 sea otters were relocated to San Nicolas Island. Most of them soon returned to the mainland, but the few that remained have prospered. With plenty of food to go around, the San Nicolas otters are in better shape than their mainland counterparts, and their population is now growing much faster than the central-coast population.

"The San Nicolas otters are much bigger than the mainland animals, their body condition is better, and they spend less time feeding," **Tinker** said. "When we looked at individual diets, a few key prey types

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Research, continued

(Sea-Otter Diets continued from page 5)

dominated, and each otter's diet looked pretty much like every other otter's diet."

The otters' preferred prey are large, energy-rich red sea urchins, which are abundant around San Nicolas Island. On the central coast, red sea urchins are much less common than the smaller purple sea urchins. The San Nicolas otters also eat marine snails and crabs, but there is little difference between the population as a whole and individual otters in terms of dietary diversity. Each otter is a generalist, with the same preferences as other otters.

The mainland otter population is strikingly different. Although the diet of the population as a whole is much more diversified than at San Nicolas, individual diets are more specialized. **Estes** said it

is not surprising that animals are highly individual in the way they feed, but the link between individual specialization and resource availability is new.

"What's new in this paper is that individuality is a plastic characteristic that emerges when resources become limited," **Estes** said. "We're seeing this in sea otters, but it probably occurs broadly in nature. It may apply to people, too. When there were just a few people running around on the face of the Earth, they were probably all doing pretty much the same thing."

Individuality in feeding behavior adds a new level of complexity to the dynamics of food webs. For wildlife managers, it means that each animal has to be considered as an individual and may not

be representative of the whole population. But the findings also suggest a potentially useful tool for assessing the status of wildlife populations, **Estes** said.

"It's very hard to know where a population stands with respect to resource limitation; we're always asking if a population is limited by the availability of food," he said. "We could conceivably look for individuality in foraging behavior as an indication that food limitation is an important factor."

According to **Estes**, scientists were already convinced before this study was completed that the availability of food is limiting the central-coast sea-otter population. He said that the same situation probably prevailed throughout California before fur traders began hunting sea otters in the 18th century, eventually driving them to the brink of extinction. But it's not clear why sea otters aren't spreading out into other areas along the California coast where they would find more food than on the central coast.

"Why this population does not expand into food-rich areas is one of the perplexing challenges we haven't been able to figure out," **Estes** said.

The full citation for the new paper is:

Tinker, M.T., Estes, J.A., and Bentall, G., 2008, Food limitation leads to behavioral diversification and dietary specialization in sea otters: Proceedings of the National Academy of Sciences, v. 105, no. 2, p. 560-565 [URL <http://www.pnas.org/cgi/content/abstract/105/2/560>].

About the author: Article author **Tim Stephens**, who holds degrees from the University of California, Santa Barbara (B.A., botany), and Cornell University (M.S., plant pathology), is a science writer in the UCSC Public Information Office. ☼



Tim Tinker hauling in a freshly caught sea otter off Cypress Point, south of Monterey Bay on the central California coast. The otter will be examined, radio-tagged, and released. **Tinker** and team will collect a comprehensive suite of behavioral and life-history data from this animal over the next 2 to 3 years, including a detailed description of the animal's diet. Photograph by **Tom Suchanek** (USGS), April 3, 2008.



USGS Participates in India-U.S. Coastal Water-Quality Workshop

By Cheryl Hapke and Thomas Boving

Rapid population growth and development are occurring in many coastal areas of Goa—India's smallest state, situated on the central west coast of the subcontinent. As sea levels rise over the next half-century and beyond, coastal regions will become more vulnerable to shoreline erosion, saltwater intrusion into coastal aquifers, increased incursion of tides in coastal rivers, microbiological and chemical contamination, and more frequent coastal flooding. India is currently undergoing tremendous economic growth, the extent and sustainability of which will be limited if safe and reliable drinking-water resources are unavailable. Both natural increases in the rates of coastal change and development pressures in the coastal zone are resulting in an urgency to formulate an adequate response strategy for the sustainable development of coastal areas.

To address these issues, 10 scientists from India and the United States met in Goa, India, March 17-21, 2008, to discuss the establishment of an International Partnership for Coastal Water Resources (IPCWR; URL <http://www.ipcwr.org>). The workshop, which was hosted by The



Some workshop participants: (front row) **Debashis Acharya, S.C. Gupta, Cheryl Hapke, Buvana Ramaswamy, Veerabaswant Reddy, Sunderarajan Krishnan, William Blanford**; (back row) **Thomas Boving, B.S. Choudri, Kavita Hawaldar, A.L. Ramanathan**. The meeting was held in the TERI conference facility.

Energy and Resources Institute (TERI; URL <http://www.teriin.org/>), included researchers from government, academia, and the private sector. The primary goal of this workshop was to strengthen existing multi-institutional links between Indian and U.S. researchers and to formalize

the design of a new interdisciplinary center focused on research related to water quality and remediation technology in coastal areas. The workshop was organized by **Thomas Boving** (Department of Geosciences, University of Rhode Island) and **B.S. Choudri** (TERI) and was funded in part by the Indo-US Science

& Technology Forum (URL <http://www.indousstf.org/>). U.S. workshop participants included U.S. Geological Survey (USGS) scientist **Cheryl Hapke** (USGS Patuxent Wildlife Research Center's Coastal Research Field Station at the University of Rhode Island), **William**



(India Water Quality continued on page 8)

◀ India, showing the states of Goa (red), where the workshop was held, and neighboring Karnataka (light green), where the workshop team took a field trip.



Thomas Boving (back left) discusses a water-quality-remediation project with students at the Bangurnagar Degree College in Dandeli, Karnataka. Students from the college conducted a recent survey in local villages to identify water-quality issues.

Meetings, continued

(India Water Quality continued from page 7)

Blanford (Department of Geology and Geophysics, Louisiana State University), and **Buvana Ramaswamy** (CDM [Camp, Dresser and McKee, Inc.]). In addition to **Choudri**, four Indian researchers with expertise ranging from hydrogeochemistry to human health participated in the workshop. During the workshop, each participant gave a presentation in his or her area of expertise, and discussions took place regarding the vision, mission, and focus of the proposed center.

A field trip was organized to provide all participants with a better understanding of the water-quality issues in Goa and the neighboring state of Karnataka. The team visited the town of Dandeli in northwestern Karnataka to experience firsthand the polluted Kali River. Upon arrival in Dandeli, **Boving** and **Choudri** gave presentations at the Bangurnagar Degree College, outlining the purpose of the new center and exploring possible future collaborative efforts between the center and the college. Students then gave

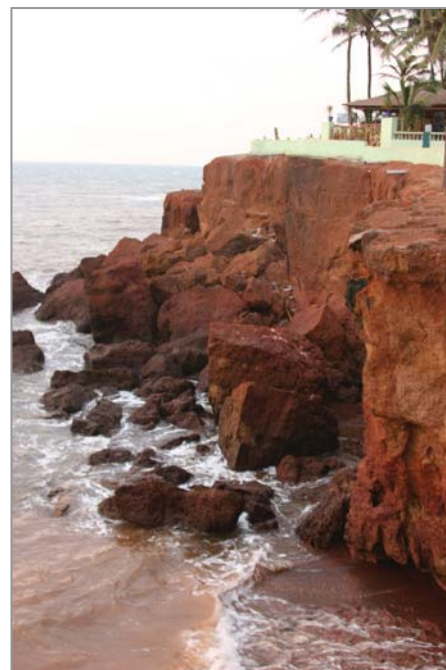


*Proposed location of a riverbank-filtration system along the Kali River near Dandeli, Karnataka. At this site, effluent from a large paper mill discharges into the river (note line of color change just beyond small island). In May 2008, **Tom Boving**, **Bill Blanford**, and **B.S. Choudri** plan to begin the installation of the filtration system, which will help to provide clean, effluent-free water to the local village.*

presentations on a water-quality survey carried out around the Kali River and shared their experiences on water quality, the local community's perception of issues related to water management, and the need for remediation of Kali River water. After the presentations, the team visited a few sites along the Kali River, including the source of pollution and the site of a planned riverbank-filtration system.

Before and immediately after the 5-day workshop, **Hapke**, **Boving**, and **Blanford** visited several sites to characterize the varied geomorphology of the Goa coastline and to explore future research sites and opportunities. The 105-km-long Goa coast is ideal for a pilot study for developing methods of measuring and predicting coastal change in India because it has sandy beaches, rocky headlands, and soft, eroding bluffs. In addition to conducting site visits along the coast, **Hapke** met with **Pravin Kunte** of the National Institute of Oceanography (URL <http://www.nio.org/jsp/indexNew.jsp>) in Dona Paula, Goa, to discuss future research collaborations. ☼

Varied geomorphology of the Goa coastline: (right) wide expanse of sandy beach at Palolem, South Goa; (below) rocky headlands surrounding a small pocket beach at Colom Beach, South Goa; (far right) bluff failure of the soft laterite cliffs at Anjuna Beach, North Goa, threatening a restaurant built on the bluff top.





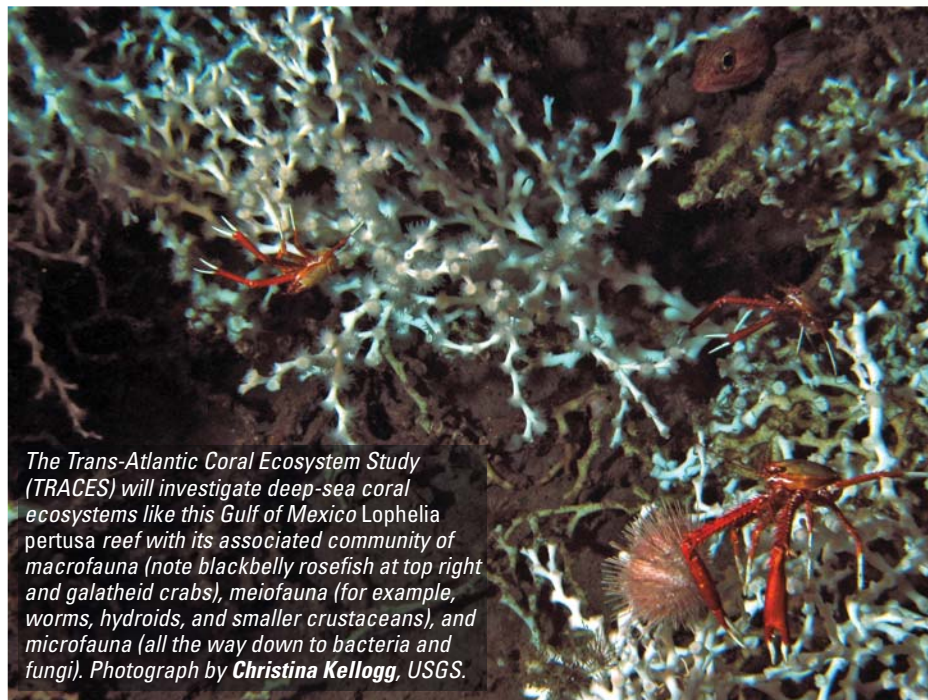
TRACES: The Trans-Atlantic Coral Ecosystem Study

By Christina Kellogg

The concept for the Trans-Atlantic Coral Ecosystem Study (TRACES) program was unveiled at a deep-sea coral symposium conducted as part of the American Association for the Advancement of Science (AAAS) Annual Meeting held in Boston, February 14-18, 2008. TRACES will be the first project to trace the flow of genes and animals across the sea-floor communities of an entire ocean basin. This international undertaking will involve researchers from both sides of the Atlantic Ocean in an integrated study of deep-sea coral (also called cold-water coral) communities.

Delegate scientists from Canada, the United States, and Brazil met in a followup workshop, held February 28-29 in Wilmington, North Carolina, to begin developing a science plan for TRACES. A second workshop took place in Europe in March. The purpose of these workshops was to define the program's research questions, establish a science plan, and lay the groundwork for future funding opportunities. The ultimate goal is to establish a funded international research program beginning in 2010.

TRACES coordinator **J. Murray Roberts** of the Scottish Association for Marine Sciences sums it up: "We must cross national boundaries to understand deep-sea coral ecosystems. The only way we can



The Trans-Atlantic Coral Ecosystem Study (TRACES) will investigate deep-sea coral ecosystems like this Gulf of Mexico Lophelia pertusa reef with its associated community of macrofauna (note blackbelly rosefish at top right and galatheid crabs), meiofauna (for example, worms, hydroids, and smaller crustaceans), and microfauna (all the way down to bacteria and fungi). Photograph by Christina Kellogg, USGS.

work out how to protect deep-sea corals is to understand how they are distributed and connected. We owe it to future generations to make sure these unique ecosystems are protected by conservation plans based on sound science."

The U.S. Geological Survey (USGS), which was a proud sponsor of the TRACES North American workshop, was represented among the delegates

by **Amanda Demopoulos** (ecologist, USGS Florida Integrated Science Center [FISC] office in Gainesville), **Christina Kellogg** (microbiologist, FISC office in St. Petersburg), and **Cheryl Morrison** (geneticist, USGS Leetown Science Center in Kearneysville, West Virginia). Information about the TRACES program is posted online at URL <http://www.lophelia.org/traces/>. ❁

Awards

USGS Biologists Receive Alaska Bird Conservation Awards

By Tony DeGange

U.S. Geological Survey (USGS) Alaska Science Center biologists **Bob Gill** and **Dirk Derksen** were presented with awards at the 25th Alaska Bird Conference held March 3-7, 2008, in Fairbanks, Alaska (URL <http://www.alaskabird.org/ABOAKBirdConferenceHome.html>). The Pete Isleib Award for "outstanding contributions to bird conservation in

Alaska" was presented to **Gill** for his 4 decades of research elucidating the life histories of Alaska's shorebirds. Most recently, **Gill** continues to share up-to-the-minute computer-generated views of the astounding transoceanic migrations of Bar-tailed Godwits, Bristle-thighed Curlews, and Whimbrels through his ongoing work with satellite

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Bob Gill (left) receiving the Pete Isleib Award for Avian Conservation from **Daniel D. Gibson** (University of Alaska Museum of the North). Named after **M.E. "Pete" Isleib**, this award is presented at the bird conference every 2 years for outstanding contributions to bird conservation in Alaska. The carving is of a Bar-tailed Godwit.

Awards, continued

(Bird Conservation continued from page 9)

telemetry (see URL <http://alaska.usgs.gov/science/biology/shorebirds/>).

Derksen was honored and recognized for establishing and continuing the Alaska Bird Conference, which has advanced the science and communication of bird research in Alaska for 25 years. Both awardees were honored at a banquet on March 6. ❁

Dirk Derksen (left) receiving an award from **Philip Martin** (U.S. Fish and Wildlife Service [USFWS]) for his vision and role in creating the first Alaska Bird Conference. The award is a framed photograph of a King Eider, taken by USFWS employee **Ted Swem**. **Martin** also presented an award to **Tom Melius** (USFWS) for his agency's role in supporting the start and continuation of the Alaska Bird Conference.



Staff and Center News

Sea-Otter Expert Joins USGS Staff

By Gloria Maender

Tim Tinker has joined the U.S. Geological Survey (USGS) Western Ecological Research Center (WERC) as its newest research ecologist. **Tinker** will lead the center's sea-otter-research program, previously directed by **Jim Estes**, who recently retired from the USGS. Formerly a research biologist with the Department of Ecology and Evolutionary Biology at the University of California, Santa Cruz (UCSC), **Tinker** has been studying sea-otter populations for 15 years in Alaska, California, and, most recently, the Russian Commander Islands. Working with **Estes**, **Tinker** played a key role in learning about the causes and effects of the sea-otter population decline in the Aleutian archipelago through the 1990s, and continues to study these threatened populations. More recently, he has also focused on the foraging ecology and demography of the threatened southern sea otter, investigating how the dynamics of individual animal behavior, food-web interactions, and anthropogenic influences act together to regulate sea-otter populations in central California (for example, see "Sea-Otter Study Reveals Striking Variability in Diets and Feeding Strategies," this issue).



*Labwork without the lab: **Tim Tinker** pipettes a blood sample taken from a Russian sea otter while trying to stay warm in a tiny cabin on the shores of the Bering Sea in winter. **Tinker** is one of the principal investigators in a cooperative U.S.-Russian effort to study the thriving sea-otter population in this remote corner of the world, in the hopes of gathering clues about the collapse of neighboring sea-otter populations in Alaska's Aleutian Islands.*

Tinker earned his Ph.D. in ecology and evolutionary biology at UCSC in 2004. He also holds an M.S. in biology from the University of Waterloo, On-

tario, Canada (1993), and a B.Sc. in zoology from the University of Guelph, Ontario, Canada (1989). **Tinker's** specialties include quantitative conservation ecology, with a particular emphasis on modeling population dynamics. He is also interested in individual behavioral strategies, particularly foraging specializations, and seeks to understand how variation in the fitness of individual strategies scales upward to population- and community-level dynamics.

The USGS WERC sea-otter program is headquartered at the Santa Cruz Field Station (URL <http://www.werc.usgs.gov/santacruz/>), whose offices are on the UCSC campus, with a satellite office, Piedras Blancas, in San Luis Obispo County.

Tinker delivered the USGS evening public lecture in Menlo Park, California, on September 27, 2007: "A Tale of Two Kelp Forests: Sea Otters and Ecosystem Dynamics in the Aleutians and the Commander Islands." A short article about the lecture was published in *Sound Waves*, September 2007, URL <http://soundwaves.usgs.gov/2007/09/outreach.html>, and the lecture can be viewed online through a link posted at URL <http://online.wr.usgs.gov/calendar/2007.html>. ❁

New Group of Mendenhall Postdoctoral Research Fellows Includes Seven Conducting Coastal and Marine Research

The U.S. Geological Survey (USGS) will welcome a new group of USGS Mendenhall Postdoctoral Research Fellows on October 1, 2008, the start of the Federal Government's fiscal year 2009 (FY09). Of the 14 postdoctoral researchers in the class of FY09, 7 will be conducting research on coastal and marine topics:

- **Serena Moseman** (Scripps Institution of Oceanography, University of California, San Diego) will work with **Kevin Kroeger**, **John Crusius**, and **John Bratton** of the USGS Coastal and Marine Geology Program and **Eric Sundquist** of the USGS Water Resources Discipline's National Research Program on "Greenhouse Gas Fluxes from the Land/Sea Margin and the Coastal Zone." **Serena** will be stationed at the USGS Woods Hole Science Center in Woods Hole, Massachusetts.
- **Christopher Smith** (Louisiana State University) will work with **Peter Swarzenski** and **Richard Poore** of the USGS Coastal and Marine Geology Program on "An Interdisciplinary (Geologic, Hydrologic and Biologic) Investigation of the Processes Controlling Florida's Harmful Algal Blooms (HABs)." **Christopher** will be stationed at the USGS Florida Integrated Science Center office in St. Petersburg.
- **Ryan Moyer** (Ohio State University) will work with **Kim Yates** and **Robert Halley** of the USGS Coastal and Marine Geology Program on "Effects of Carbon Dioxide on Neritic Calcifying Organisms and Carbonate Sediments" at the USGS Florida Integrated Science Center office in St. Petersburg.
- **Li Erikson** (Lund Institute of Technology, Sweden) will work with **Bruce Richmond**, **Curt Storlazzi**, and **Patrick Barnard** of the USGS Coastal and Marine Geology Program, geographer **Carl Markon** of the USGS Alaska Science Center, and **John (Lyle) Mars** of the USGS Eastern Mineral Resources Team on "Historical Shoreline Positions and Coastal Change of the U.S. Arctic Coast." **Li** will be part of the USGS Western Coastal and Marine Geology Team in Santa Cruz, California.
- **Alex Apotsos** (Massachusetts Institute of Technology) will work with **Bruce Jaffe**, **Guy Gelfenbaum**, and **Eric Geist** of the USGS Coastal and Marine Geology Program, **Brian Atwater** of the USGS Earthquake Hazards Team, and **Vasily Titov** of the National Oceanic and Atmospheric Administration on "Tsunami Sedimentology." **Alex** will be part of the USGS Western Coastal and Marine Geology Team in Santa Cruz, California.
- **R. Burton Thomas** (Pennsylvania State University) will work with **Robert Rosenbauer** of the USGS Coastal and Marine Geology Program, **Yousif Kharaka** of the USGS Water Resources Discipline's National Research Program, and **Robert Burruss** of the USGS Energy Resources Team on "Geologic Storage of CO₂: Potential Environmental and Human Health Effects." **Burton** will be part of the Western Coastal and Marine Geology Team in Menlo Park, California.



*Incoming USGS Mendenhall Postdoctoral Research Fellow **Li Erikson**, pictured here with her daughter **Sanna** in May 2005 at Twin Lakes Beach in Santa Cruz, California.*

- **Christopher Conaway** (University of California, Santa Cruz) will work with **Curt Storlazzi**, **Jon Warrick**, **Amy Draut**, and **Dave Rubin** of the USGS Coastal and Marine Geology Program on "Brown-to-Blue: Fluvial Deposition in the Coastal Ocean and Its Impact on Nearshore Ecosystems." **Christopher** will be part of the USGS Western Coastal and Marine Geology Team in Santa Cruz, California.

The FY09 postdoctoral researchers will be the ninth group hired for 2-year appointments under the Mendenhall Postdoctoral Research Fellowship Program, established in 2001 in honor of **Walter C. Mendenhall**, the fifth director of the USGS. In December 2007, the 100th Mendenhall Fellow joined us at the Reno office. Plans are underway for recruiting the FY10 class.

The Mendenhall Postdoctoral Fellowship Program's Web site (URL <http://geology.usgs.gov/postdoc/>) contains brief descriptions of the research being conducted by Mendenhall Fellows, contact information, and lists of products. The influx of postdoctoral talent through the Mendenhall Program continues to be a vital resource for the future of our science. ❁

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